

[54] FILLING VALVE FOR COUNTERPRESSURE FILLING MACHINES

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[57] ABSTRACT

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In a filling valve for a counterpressure filling machine for filling containers, such as bottles, cans and the like, comprising a filling valve body including a filling channel, a centering tulip for positioning a container below the filling channel in sealed connection therewith, second channels in said valve body coaxing with said filling channel for at least one of evacuating, pressurizing and relieving a container located within said second channels, wherein the improvement comprises each said auxiliary valve includes an axially elongated control bolt located in said filling valve body for opening one of said second channels, said control bolt having a first end located within said filling valve body and a second end located on the outside of said filling valve body, a cam plate located opposite the second end of said control bolt outside of said filling valve body and selectively engageable by the second end of said control bolt, and means associated with said centering tulip for cooperating with said control bolt and said cam plate when a container is present in the centering tulip for properly axially displacing said control bolt and opening the respective said second channel by axial displacement of said second end of said control bolt by said cam plate.

Related U.S. Application Data

[63] Continuation of Ser. No. 704,747, Feb. 25, 1985, abandoned.

[30] Foreign Application Priority Data

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[51] Int. Cl.<sup>4</sup> ..... B65B 31/04

[52] U.S. Cl. .... 141/141; 141/6

[58] Field of Search ..... 141/6, 140, 141, 142, 141/143, 147, 192, 193, 207, 276, 290

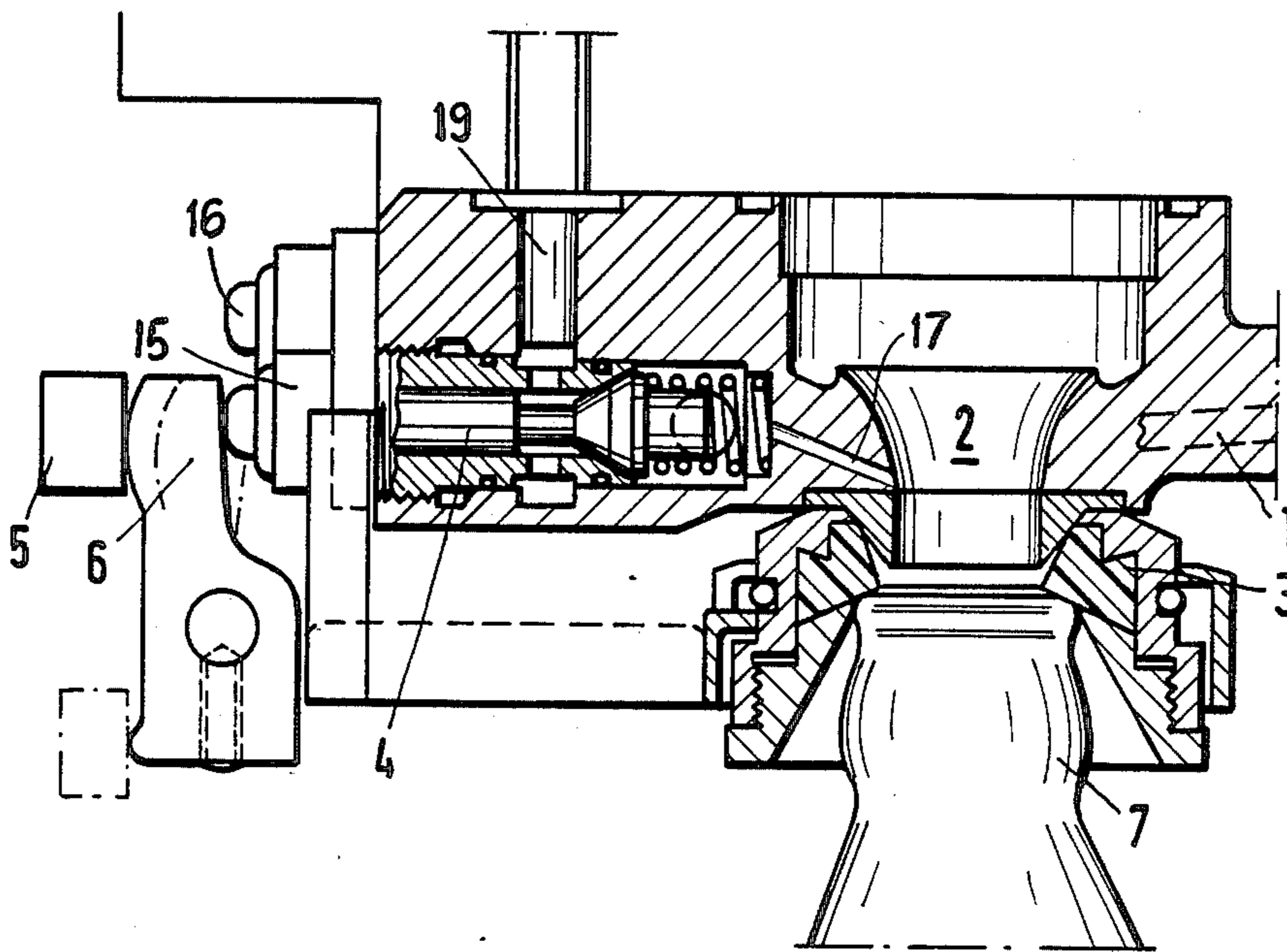
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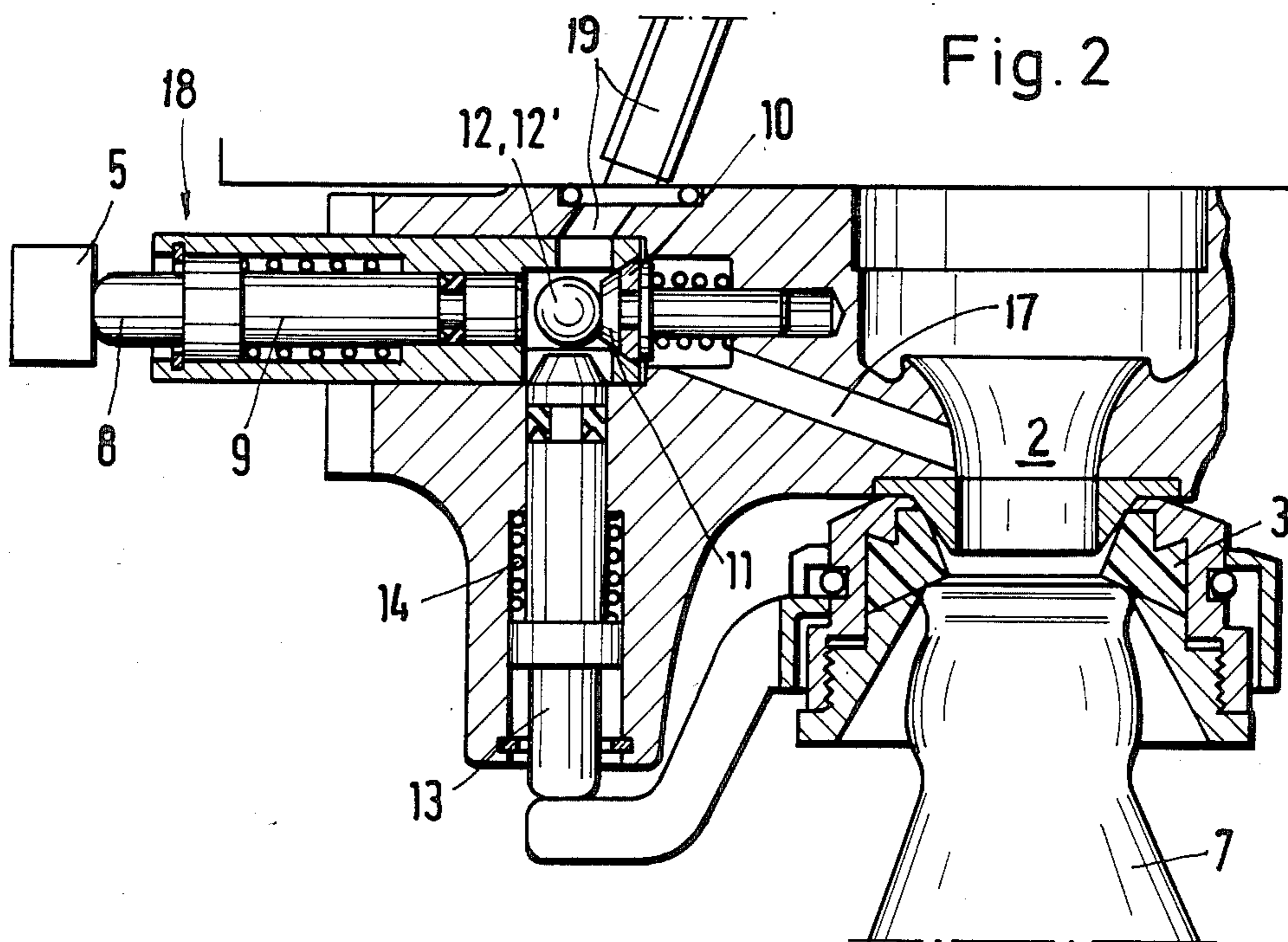
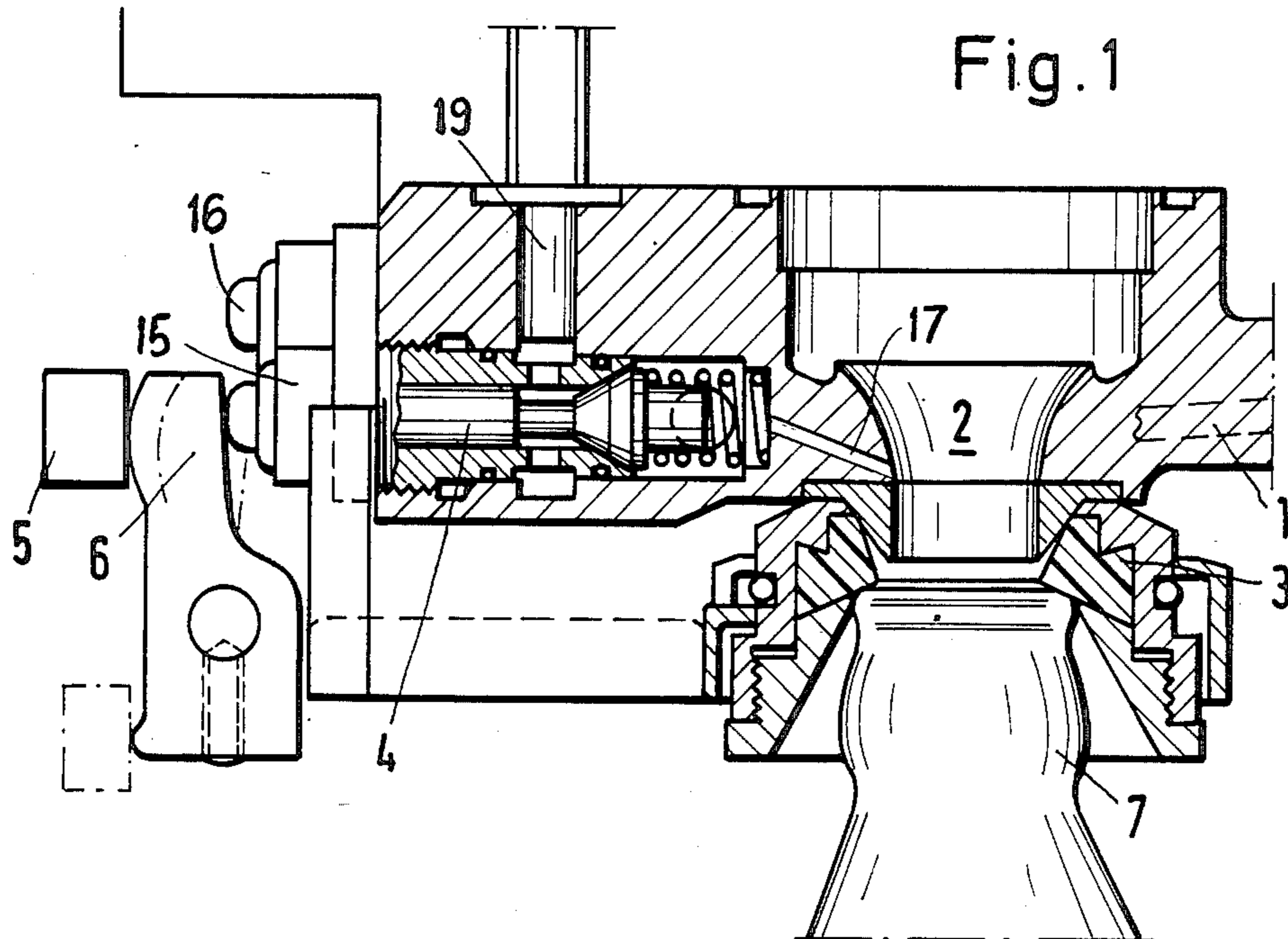
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Primary Examiner—Mark J. Thronson

4 Claims, 1 Drawing Sheet







## FILLING VALVE FOR COUNTERPRESSURE FILLING MACHINES

This is a continuation of application Ser. No. 704,747, 5  
filed Feb. 25, 1985, now abandoned.

The invention is directed to a filling valve for filling  
of containers such as bottles, cans and such like, consist-  
ing of a filling valve body and coacting with it channels  
for evacuation, pressurizing and releasing as well as 10  
valves associated with the channels, which are control-  
lable separately and/or collectively from the exterior.

Here one deals with rotating filling machines into  
which the bottles to be filled are fed spaced from each  
other, then revolve in the filling machine rotating circle 15  
and are subsequently discharged out of the filling ma-  
chine. Hereby the bottles are centered by means of  
centering tulips immediately after transfer onto the  
filling machine rotation circle, they are lifted from  
below and moved against the filling valves. The func- 20  
tions of this filling element go on automatically pro-  
vided a bottle is applied below the filling element,  
meaning the bottle is evacuated then is pressurized by  
means of pressurizing gas onto the kettle internal pres- 25  
sure and subsequently filled. In particular for a vacuum  
supply the filling valve comprises an additional auxil-  
iary valve, whose control bolt protrudes towards the  
outside and is actuated by fixed or pivotable cam plates.  
These cam plates do not react to missing or damaged  
bottles, so that the applicable valves are actuated also in 30  
such cases, without their function being required.  
Hereby occasionally losses occur with filling machines  
of this sort depending upon their throughput perfor-  
mance, which must be avoided within the framework of  
the present invention. The invention has therefore set 35  
itself the goal to allow the valve to function only when  
a flawless bottle is located under the filling valve for the  
purpose of being filled.

This task is solved in accordance with the novelty by  
supporting auxiliary control segments interswitchably 40  
at the valve parts between the control bolt of the valves  
and the cam plate provided for the control operation.

Hereby it has shown itself to be advisable, that an  
auxiliary control segment is pivotably supported at the 45  
centering tulip and displaceable by same into the range  
of the principal cam plate between it and the control  
bolt.

It is also conceivable, that the control bolt can be  
designed to be divided and an auxiliary control element  
is interswitchable between its outer and its inner portion 50  
pointing towards the valve.

This auxiliary control element can be constituted  
within the framework of the invention by a sphere inter-  
switchable by bolts actuatable by the centering tulip.

It is already known in the state of the art to directly 55  
initiate the function of certain valves by means of con-  
trol levers attached at the centering tulip, as for instance  
as is shown in the DE-OS No. 1 632 014. Hereby one  
deals with the unloading of certain areas or with the  
control functions which are accomplished directly by 60  
the centering tulip.

Counter to this, the present invention has the advan-  
tage that fixed control paths exist in correspondingly  
stable construction, which are generally suited for the  
switching and control of the valves concerned, but can 65  
only function when the bottle in question is applied at  
the desired level below the filling element. The embodi-  
ment proposed in the present invention has the addi-

tional advantage, that normal valves can also be subse-  
quently equipped with such a safety switching, without  
that special modification work has to be accomplished  
at the valve itself. This is important inasmuch as the  
filling valves concerned are extremely complicated and  
fabricated from high grade material.

In the following the invention is described with par-  
ticularity with the help of embodiment examples de-  
picted in the drawings.

The drawings show:

FIG. 1 the filling valve in cross-section with inter-  
switchable control part, and

FIG. 2 a design of the filling valve with a divided  
control bolt.

The filling valve shown in FIG. 1 consists of a main  
valve body 1 and a channel 2 for the filling liquid. In this  
channel 2 a valve shutoff body, not further shown here,  
is supported. The main valve body 1 additionally com-  
prises auxiliary valves, which can be provided for evac-  
uation of the bottle as well as for its release. Addition-  
ally, a centering tulip 3 which can be moved up and  
down in axial direction is located below the main valve  
body 1, whose task it is to center the bottles supplied  
from the feed star into the filling machine rotation circle  
and to seal them against the atmosphere during the  
pressing-on operation at the main valve body 1. The  
previously mentioned control valves generally exhibit a  
control bolt 4 directed towards the outside, which is  
actuatable by a fixed cam 5. During rotation of the  
filling machine this cam plate 5 is retained in an applic-  
able position, so that all control bolts sliding by it are  
actuated. The invention now provides that an auxiliary  
control segment 6 is interswitchably supported at the  
valve parts or such like between such a control bolt 4  
and the cam plate 5 provided for the control operation,  
so that, if the cam plate 5 is conformally arranged  
spaced with respect to the front side of the control bolt  
4 it can only enter into action, when an auxiliary control  
segment 6 is present between the inner cam plate and  
the control bolt 4. As can be seen from FIG. 1, it is  
appropriate to connect the control segment 6 with the  
centering tulip 3 and to render it movable up and down  
in axial direction according to the lifting motion of a  
bottle 7, meaning as soon as a flawless bottle 7 is pres-  
ent, it will move the centering tulip 3 in axial direction  
towards the top and will move the auxiliary control  
segment 6 into the range of the cam plate 5, which then  
effectuates the corresponding actuation of the control  
bolt 4 if the filling machine continues to rotate.

In FIG. 1 a valve can be connected to the bottle 7 via  
the channel 17. Another valve can be connected to the  
bottle to bring the pressure in the bottle up to the pres-  
sure in the filling container. Channel 19 is connected to  
the filling opening 2 through the channel 17 for evacu-  
ating the bottle 7.

According to the embodiment variant depicted in  
FIG. 2 the control bolt 8 is divided and exhibits an  
auxiliary control element 12 between the outer portion  
9 and the portion 11 pointing to the valve 10 proper,  
which auxiliary control element is designed as a sphere  
12 in the embodiment example and can be lifted by a  
control bolt 13 by means of the centering tulip 3 into the  
operating sequence. This occurs automatically as soon  
as a bottle 7 is applied below the filling element. As soon  
as the bottle 7 is lowered by the lifting device not shown  
here in detail, the bolt 13 is lowered by action of the  
spring 14, whereby the sphere is moved out of range of  
the control bolts 8, 9 and 10. If no bottle 7 is applied



below the filling element, the sphere 12' does not come into range of the divided control bolts. If the outer portion 9 of the control bolt 8 is actuated by the cam plate 5 when the sphere 12' is missing, then the outer portion is displaced in direction of the filling valve, but cannot accomplish its effect, because it does not reach the valve 10 and can thus not open it. In place of the direct influencing of the control bolts concerned by portions of the filling valve proposed here, it is conceivable to provide an applicable scanning of an electric, optical or electronic sort, with which in accordance with what was previously described, an auxiliary control element is interswitched between the control bolt 4, 8 and the cam plate 5 if a flawless bottle 7 is present. This is of particular importance then, if fixed centering tulips 3 have been provided, so that their axial displacement action cannot be utilized for effecting the interswitching of the auxiliary control segment 6, 12, 12'.

In FIG. 2 an evacuation valve 18 is displayed connected by the channels 17, 19 to the filling channel 2. This arrangement operates similar to the one shown in FIG. 1 and described above.

We claim:

1. In a filling valve for a counterpressure filling machine for filling containers, such as bottles, cans and the like, comprising a filling valve body including a filling channel, a centering tulip for positioning a container below the filling channel in sealed connection therewith, second channels in said valve body coacting with said filling channel for at least one of evacuating, pressurizing and relieving a container located in said centering tulip, and auxiliary valves located within said second channels, wherein the improvement comprises each said auxiliary valve includes an axially elongated control bolt located in said filling valve body for opening one of said second channels, said control bolt having a first end located within said filling valve body and a second end located on the outside of said filling valve body, a cam plate located opposite the second end of said control bolt outside of said filling valve body and selectively engageable by the second end of said control bolt, and means associated with said centering tulip for cooperating with said control bolt and said cam plate when a container is present in the centering tulip for properly axially displacing said control bolt and opening the respective said second channel by axial displacement of said second end of said control bolt by said cam plate.

2. Filling valve as set forth in claim 1, wherein said cam plate and the second end of said control bolt are spaced apart, said means associated with said centering tulip comprises an auxiliary control segment pivotally supported at said centering tulip and displaceable into

the space between said cam plate and the second end of said control bolt for operating said control bolt.

3. In a filling valve, as set forth in claim 1, wherein said control bolt comprises a first section for opening one of said second channels and a second section forming the second end of said control bolt and spaced in the axial direction of said control bolt from said first section, means selectively positionable between said first and second sections of said control bolt for effecting the opening of the one of said second channels, and said means associated with said centering tulip being engageable with said means selectively positionable between said first and second sections of said control bolt for opening said second channel.

4. In a filling valve for a counterpressure filling machine for filling containers, such as bottles, cans and the like, comprising a filling valve body including a filling channel, a centering tulip for positioning a container below the filling channel in sealed connection therewith, second channels in said valve body coacting with said filling channel for at least one of evacuating, pressurizing and relieving a container located in said centering tulip, and auxiliary valves located within said second channels, wherein the improvement comprises each said auxiliary valve includes an axially elongated control bolt located in said filling valve body for opening one of said second channels, said control bolt having a first end located within said filling valve body and a second end located on the outside of said filling valve body, a cam plate located opposite the second end of said control bolt outside of said filling valve body, and means associated with said centering tulip for cooperating with said control bolt and said cam plate when a container is present in the centering tulip for properly displacing said control bolt and opening the respective said second channel, said control bolt comprises a first section for opening one of said second channels and a second section forming the second end of said control bolt and spaced in the axial direction of said control bolt from said first section, means selectively positionable between said first and second sections of said control bolt for effecting the opening of the one of said second channels, and said means associated with said centering tulip being engageable with said means selectively positionable between said first and second sections of said control bolt for opening said second channel, said means selectively positionable between said control bolt sections comprises a spherical member, and said means associated with said centering tulip comprises a bolt engageable with said spherical member and arranged to position said spherical member between the first and second sections of said control bolt when said centering tulip positions a container below the filling channel in sealed connection therewith.

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